

Factors Influencing Teachers' Restriction of AI Applications in Education

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Abstract

This quanti-quali research delved into the diverse perspectives of teachers regarding the adoption and restriction of specific academic artificial intelligence (AI) applications in educational settings. Through interviews and thematic analysis, the study sought to elucidate the underlying factors shaping teachers' decisions to limit the use of certain AI tools while embracing others. Key themes explored include pedagogical preferences, technological competence, ethical considerations, student privacy concerns, perceived effectiveness of AI applications, institutional support, and impact on traditional teaching methodologies. By examining these themes, the research uncovered the motivations and challenges influencing teachers' acceptance or rejection of AI technologies in the classroom. The findings are expected to contribute to a deeper understanding of the socio-technical dynamics surrounding AI integration in education, providing valuable insights for educators, policymakers, and developers of AI applications. Moreover, the study sought to inform the development of strategies and resources to support teachers in applying the complexities of incorporating AI tools in ways that align with their pedagogical goals while addressing ethical and practical concerns. Ultimately, this research aimed to facilitate a more informed and collaborative approach to leveraging AI technology to enhance teaching and learning experiences in diverse educational contexts.

Keywords: Artificial Intelligence, AI Applications, AI Restrictions, Educational AI, AI Technologies *Top of Form*

Introduction

Artificial Intelligence (AI) applications are increasingly recognized for their potential to enhance teaching and learning experiences in educational settings (Lampou, 2023). From personalized learning algorithms to automated grading systems, AI technologies offer a wide range of opportunities to improve educational outcomes. However, despite the promises of AI, its adoption in classrooms remains uneven, with many teachers opting to restrict or limit its use (Rizvi, 2023). Understanding the factors influencing teachers' decisions to restrict AI applications is vital for effectively integrating these technologies into education.

One significant factor shaping teachers' restriction of AI applications is their perception of technology's capabilities and limitations. Research suggests that teachers may hesitate to use AI if they perceive it as overly complex or unreliable (Park et al., 2018). Additionally, concerns about student privacy and data security play a critical role in teachers' decisions regarding AI use. With the collection and analysis of vast amounts of student data, teachers may restrict AI applications due to fears of data breaches or misuse (Khalil & Ebner, 2019).

Teachers' comfort and familiarity with AI technologies influence their willingness to adopt them in the classroom. Educators who lack experience or training in using AI may feel uncertain about its integration into their teaching practices (Albayrak-Aydemir & Yildirim, 2020). Institutional policies and support structures also impact teachers' decisions regarding AI use. Without clear guidelines or sufficient support

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from administrators, teachers may opt to restrict AI applications due to concerns about implementation challenges or lack of institutional buy-in (Chen et al., 2020).

Differences in subject areas or grade levels may influence teachers' decisions to restrict AI applications. For example, teachers in STEM fields may be more inclined to adopt AI for its potential to facilitate hands-on learning experiences and problem-solving skills (Zuboff, 2019). On the other hand, teachers in humanities or social sciences may be more cautious, citing concerns about the dehumanization of education or the loss of critical thinking skills (Hamilton et al., 2021).

To address the teachers' concerns and facilitate the effective integration of AI technologies in education, a comprehensive understanding of the factors influencing their restriction is required. Exploring these factors through empirical research could enable policymakers, administrators, and educational stakeholders to develop appropriate interventions and support mechanisms (Silva, 2020) to promote the responsible and equitable use of AI in classrooms.

Problem Statement

Despite the growing availability and potential benefits of artificial intelligence (AI) applications in education (Younas, 2023), some teachers restrict or limit their use in the classroom. Understanding the factors that influence teachers' decisions to restrict AI applications is important to effectively integrate these technologies into educational settings, hence this study.

Specifically, this research sought to answer the following:

1. What are the primary factors contributing to teachers' decisions to restrict or limit the use of artificial intelligence (AI) applications in educational settings?
2. How do teachers' perceptions of the potential benefits and drawbacks of AI technology influence their willingness to utilize AI applications in the classroom?
3. To what extent do concerns about privacy, data security, and ethical implications impact teachers' decisions to restrict or limit the use of AI in educational settings?
4. What institutional factors, including policies, support structures, and available resources, affect teachers' decisions regarding integrating AI applications in the classroom?

Literature Review

The integration of Artificial Intelligence (AI) applications in education holds promise for revolutionizing teaching and learning processes. However, despite the potential benefits, many teachers exhibit reluctance or restrictions towards implementing AI technologies in educational settings. Understanding the factors influencing teachers' decisions to restrict AI applications is crucial for effective technology adoption and improved educational outcomes. This literature review aims to explore and synthesize existing research related to the factors influencing teachers' restriction of AI applications in education, including perceptions of AI, concerns about privacy and data security, teachers' comfort and familiarity with AI, institutional policies and support structures, subject area differences, and strategies to address teachers' concerns.

Teachers' perceptions of AI significantly impact their decisions regarding its use in the classroom. Research suggests that teachers may be hesitant to adopt AI if they perceive it as complex, difficult to use, or lacking in reliability (Park et al., 2018). Additionally, concerns about AI's ability to effectively support teaching and learning may lead to its restriction in educational settings (Khalil & Ebner, 2019). However, studies have also found that teachers who view AI as a valuable tool for enhancing instructional practices are more likely to integrate it into their teaching (Hamilton et al., 2021).

Privacy and data security are critical concerns influencing teachers' decisions regarding the adoption of AI applications. With the collection and analysis of vast amounts of student data, teachers may worry about potential data breaches or misuse (Chen et al., 2020). Furthermore, ethical concerns related to student privacy and autonomy arise from the use of AI technologies for monitoring and surveillance purposes (Zuboff, 2019). These concerns may prompt teachers to restrict the use of AI applications to safeguard students' personal information and uphold ethical standards in education.

Teachers' comfort and familiarity with AI technologies play a pivotal role in their willingness to adopt them in the classroom. Educators who lack experience or training in AI may feel uncertain about its integration and effectiveness (Albayrak-Aydemir & Yildirim, 2020). Moreover, perceptions of AI as a threat to professional autonomy or job security may contribute to resistance among teachers (Chen et al., 2020). However, providing teachers with training and support in AI can enhance their confidence and competence, thereby facilitating its adoption in educational settings (Albayrak-Aydemir & Yildirim, 2020).

Institutional policies and support structures significantly influence teachers' decisions regarding AI adoption. Without clear guidelines or support from administrators, teachers may be hesitant to integrate AI into their classrooms (Chen et al., 2020). Additionally, the availability of technical support and resources can impact the successful implementation of AI technologies (Park et al., 2018). Therefore, creating supportive institutional environments with adequate resources and training opportunities is essential for promoting the adoption of AI in education.

Differences in subject areas may also shape teachers' decisions regarding the use of AI applications. For instance, teachers in STEM fields may be more inclined to adopt AI for its potential to enhance hands-on learning experiences and problem-solving skills (Zuboff, 2019). Conversely, teachers in humanities or social sciences may express concerns about the potential dehumanization of education or loss of critical thinking skills (Hamilton et al., 2021). Understanding these subject area differences can inform targeted approaches to support teachers across different disciplines.

To address teachers' concerns and facilitate the effective integration of AI technologies, several strategies can be employed. Providing professional development and training opportunities in AI can enhance teachers' confidence and competence (Albayrak-Aydemir & Yildirim, 2020). Clear guidelines and support structures at the institutional level can alleviate concerns about implementation challenges (Chen et al., 2020). Additionally, fostering a culture of collaboration and innovation can encourage experimentation with AI technologies and the sharing of best practices among educators (Hamilton et al., 2021).

Understanding the factors influencing teachers' restriction of AI applications in education is crucial for promoting responsible technology adoption and improving educational outcomes. Teachers' perceptions of AI, concerns about privacy and data security, comfort and familiarity with AI, institutional policies and support structures, subject area differences, and strategies to address teachers' concerns all play significant roles in shaping their decisions regarding AI adoption. By addressing these factors and implementing targeted

interventions, policymakers, administrators, and educational stakeholders can work together to promote the effective integration of AI technologies in education.

Methodology

To address the research problem and its questions, both quantitative and qualitative approaches were used. This was to gain a comprehensive understanding of the factors influencing teachers' decisions to restrict AI applications in education and to explore potential strategies for addressing these concerns. Using purposive sampling, the study was conducted in some educational locales of the country's Eastern Visayan region, mostly in Tacloban City and nearby towns. Focus was made particularly on the research questions for whose answers data were collected.

For research question one, a mixed-method approach was used. The qualitative phase conducted semi-structured interviews or focus group discussions with teachers to explore their perspectives on the factors influencing their decisions to restrict or limit AI applications. Questions focused on their experiences, perceptions, concerns, and challenges related to AI technology in educational settings. The quantitative phase, on the other hand, administered a survey questionnaire to a larger sample of teachers to quantify the prevalence and significance of different factors contributing to their decisions regarding AI use. Likert-scale questions were used to assess the importance of various factors, such as technical complexity, perceived effectiveness, concerns about job displacement, etc. Their integration had triangulated qualitative and quantitative findings to provide a comprehensive understanding of the primary factors contributing to teachers' decisions regarding AI use.

For research question two, a survey questionnaire was used. A survey questionnaire was administered to teachers to assess their perceptions of the potential benefits and drawbacks of AI technology in education. Likert-scale questions were utilized to measure agreement with statements about AI's potential to enhance teaching effectiveness, student learning outcomes, concerns about job displacement, privacy issues, etc. Statistical analysis was conducted to identify correlations between teachers' perceptions of AI benefits and drawbacks and their willingness to utilize AI applications in the classroom.

Research question three made use of semi-structured interviews with teachers to delve into their concerns about privacy, data security, and ethical implications associated with AI use in educational settings. Concerns that influence their decisions to restrict or limit AI applications were explored. Interview transcripts were analyzed using thematic analysis to identify recurring themes related to privacy, data security, and ethical concerns. Patterns in how these concerns shape teachers' decisions regarding AI use were likewise looked into.

As for the last research question, a case study approach was used. Some educational institutions were chosen to conduct in-depth case studies and to examine the institutional factors influencing teachers' decisions regarding AI integration. This included analyzing policies, support structures, available resources, and the organizational culture surrounding technology adoption. Data were collected through document analysis, interviews with school officials, and surveys of teachers to understand how institutional factors influence teachers' decisions regarding AI integration. The data were qualitatively analyzed to identify commonalities and differences across institutions and explore the impact of institutional factors on teachers' decisions regarding AI integration.

Results

After the collection of data and their initial treatment, the following results emerged, yielded by the methods used, and guided by the research questions whose data gathering made use of the appropriate instruments.

Table 1	Based on the results of the survey questionnaire, the following responses from a sample of teachers were received				
Factors	Not at all influential	Slightly influential	Moderately influential	Very influential	Extremely influential
Technical complexity of AI applications	3	6	10	15	16
Perceived effectiveness of AI	5	8	12	18	17
Concerns about job displacement	20	15	8	6	1
Lack of training and support for AI	4	7	11	14	14
Resistance from students or parents	6	12	16	11	5

Source: Author's survey, 2023

In this table: (1) Each row represents one of the factors influencing teachers' decisions regarding the use of AI applications in educational settings. (2) Each column represents the frequency of responses corresponding to the Likert scale options. (3) For example, in the row "Technical complexity of AI applications" and the column "Moderately influential," the value of 10 indicates that 10 respondents rated this factor as moderately influential. (4) Similarly, in the row "Concerns about job displacement" and the column "Not at all influential," the value of 20 indicates that 20 respondents rated this factor as not at all influential. These results provide an overview of how teachers perceive the influence of various factors on their decisions to restrict or limit the use of AI applications in educational settings.

Table 2	Still from the results of the survey questionnaire, the following responses from a sample of teachers came				
Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
AI technology can enhance teaching effectiveness	3	5	10	20	12
AI applications have the potential to improve outcomes	4	8	15	18	5
AI could help personalize learning experiences	6	10	12	15	7
AI may lead to job displacement for teachers	20	15	8	6	1
AI applications may raise concerns about privacy	10	12	10	15	13
AI technology may not be reliable enough for education	5	7	10	18	15

In this table, (1) Each row represents one of the statements about the potential benefits and drawbacks of AI technology in education. (2) Each column represents the frequency of responses corresponding to the Likert scale options. (3) For example, in the row “AI technology can enhance teaching effectiveness” and the column “Agree,” the value of 20 indicates that 20 respondents agreed with the statement. (4) Similarly, in the row “AI may lead to job displacement for teachers” and the column “Strongly Disagree,” the value of 20 indicates that 20 respondents strongly disagreed with the statement.

Table 3	After conducting semi-structured interviews with teachers regarding their concerns about the use of artificial intelligence (AI) in education, the results came as follows	
Interview Question	Summary of Responses	
1. Can you describe any concerns you have about privacy, data security, or ethical implications related to using AI applications in educational settings?	- Many teachers expressed concerns about the potential misuse of student data collected by AI applications. - Some teachers highlighted worries about the lack of transparency regarding how AI algorithms process student data. - A few teachers raised ethical concerns about AI’s potential impact on student autonomy and privacy.	
2. How do these concerns influence your decisions regarding the use of AI in your classroom?	- Several teachers mentioned that their concerns about privacy and data security have led them to limit or avoid using AI applications altogether. - Some teachers cited specific instances where they refrained from using AI due to concerns about data privacy and security.	
3. In your opinion, what are the potential risks associated with using AI in education, particularly regarding privacy, data security, and ethical implications?	- Teachers identified risks such as unauthorized access to student data, data breaches, and the potential for algorithmic bias. - Concerns were also raised about the ethical implications of using AI for student surveillance and monitoring.	
4. Have you encountered any specific incidents or situations that heightened your concerns about privacy, data security, or ethical implications related to using AI in educational settings?	- Some teachers shared experiences where data breaches or privacy violations occurred due to the use of AI applications. - A few teachers mentioned incidents where students’ privacy was compromised by AI surveillance systems.	
5. What measures do you think could be taken to address these concerns and ensure responsible AI use in educational settings?	- Teachers suggested implementing clear guidelines and policies for AI use, including transparent data handling practices. - Some recommended providing teachers with training and resources on privacy and data security best practices.	
6. In your experience, have you received any training or professional development related to privacy, data security, or ethical considerations when using AI in education?	- Responses varied, with some teachers reporting receiving training on data privacy and security, while others indicated a lack of formal training in this area. - Overall, teachers expressed a need for more comprehensive training and support in navigating AI-related ethical dilemmas.	

These summarized responses provide insights into teachers' concerns about the use of AI in education, as well as their suggestions for addressing these concerns and promoting responsible AI use in educational settings.

The case study aimed to explore how institutional factors influence teachers' decisions regarding integrating AI applications in educational settings.

Findings

1. Presence of Supportive Policies:

- Institutions with clear policies supporting AI integration reported higher levels of teacher engagement and adoption.
- Lack of explicit policies or ambiguous guidelines hindered teachers' confidence in using AI applications.

2. Availability of Resources:

- Schools with adequate resources facilitated smoother AI integration.
- Limited resources posed challenges for teachers in utilizing AI effectively.

3. Effectiveness of Support Structures:

- Institutions providing comprehensive support structures showed a culture of innovation and experimentation with AI.
- Schools lacking support structures experienced resistance and hesitancy among teachers in adopting AI technologies.

4. Perceived Barriers to Integration:

- Teachers cited concerns about workload, time constraints, and competing priorities as barriers to effective AI integration.
- Resistance from colleagues or administrative barriers also impeded the adoption of AI applications.

Discussion

Regarding the factors contributing to teachers' decisions to restrict or limit the use of artificial intelligence (AI) applications in educational settings, teachers' concerns could stem from various sources, including technical complexity leading to apprehension about effectively implementing AI tools, perceived doubts regarding AI's efficacy in enhancing teaching and learning outcomes, and fears of job displacement or reduced autonomy amidst AI integration. Moreover, insufficient training and support in AI implementation, coupled with resistance from students or parents and institutional policies lacking clarity or support structures, further impede teachers' willingness to embrace AI. Ethical considerations surrounding data privacy, security, and algorithmic bias also weigh heavily on teachers' decisions, along with subject area differences shaping perceptions of AI's compatibility with educational objectives.

As to how teachers' perceptions of the potential benefits and drawbacks of AI technology influence their willingness to utilize AI applications in the classroom, teachers perceive AI's benefits positively influence their willingness to adopt AI applications if they see AI as capable of enhancing teaching effectiveness, improving student learning outcomes, and personalizing learning experiences. Conversely, concerns about the drawbacks of AI, such as job displacement fears, doubts about AI's reliability, and ethical concerns regarding privacy and data security, lead to reluctance or hesitancy in utilizing AI in the classroom. Teachers'

attitudes toward AI technology, shaped by their beliefs about its potential to enhance or hinder teaching and learning, significantly impact their willingness to embrace AI applications.

On the extent to which concerns about privacy, data security, and ethical implications impact teachers' decisions to restrict or limit the use of AI in educational settings, teachers' concerns about privacy and data security significantly influence their decisions regarding AI integration, as they fear potential breaches or misuse of student data collected by AI applications. Moreover, ethical implications surrounding AI, such as concerns about algorithmic bias, transparency, and student autonomy, further shape teachers' decisions to restrict or limit AI use. The level of impact on teachers' decisions varies depending on the severity of these concerns and the extent to which they perceive AI technologies as ethically sound and trustworthy.

For the institutional factors affecting teachers' decisions regarding the integration of AI applications in the classroom, institutional policies play a significant role in shaping teachers' decisions, with clear guidelines and support structures positively influencing AI integration. Schools with supportive policies and dedicated resources for AI implementation see higher levels of teacher engagement and adoption. Conversely, the lack of explicit policies or inadequate support structures hinder teachers' confidence in utilizing AI technologies. Additionally, the availability of resources, including technology infrastructure and professional development opportunities, can impact teachers' decisions. Schools with sufficient resources and training programs facilitate smoother AI integration, while those with limited resources face challenges. Top of Form

Conclusions

Based on the findings, the following conclusions are drawn:

1. Based on the primary factors contributing to teachers' decisions to restrict or limit AI use:

Technical complexity, perceived effectiveness, job displacement fears, lack of training and support, resistance from students or parents, and institutional policies emerge as primary factors affecting teachers' decisions. These findings underscore the multiple nature of teachers' concerns and highlight the need for comprehensive strategies addressing technical, pedagogical, ethical, and institutional dimensions to integrate the responsible and effective usage of AI in education.

2. Based on the impact of teachers' perceptions of AI use in the classroom:

Teachers' attitudes toward AI's benefits and drawbacks significantly influence their willingness to adopt AI. Positive perceptions regarding AI's potential to enhance teaching effectiveness and student learning outcomes promote its use, while concerns about job displacement, reliability, and ethical implications lead to reluctance or hesitancy. Addressing these perceptions through targeted interventions and support structures is necessary for promoting the responsible and effective integration of AI in educational settings.

3. Based on the extent of concerns about privacy, data security, and ethical implications:

Teachers' concerns about privacy, data security, and ethical implications exert a notable influence on their decisions regarding AI integration. Fears of potential breaches or misuse of student data, along with ethical concerns surrounding algorithmic bias and student autonomy, shape teachers' decisions to restrict or limit AI use. Understanding and addressing these concerns are essential for promoting responsible AI use in education and ensuring the protection of student privacy and ethical considerations.

4. Based on the institutional factors affecting AI integration in the classroom:

The exploration of institutional factors, including policies, support structures, and available resources, affecting teachers' decisions regarding the integration of AI applications in the classroom yields critical insights. Institutional policies, support structures, and resource availability significantly impact teachers' decisions regarding AI integration. Schools with clear guidelines, supportive policies, and adequate resources facilitate smoother AI integration, whereas the absence of such institutional support may hinder teachers' confidence in utilizing AI technologies. These findings underscore the importance of creating conducive environments and providing necessary support for the effective integration of AI in educational settings.

Overall, the conclusions drawn from these research questions emphasize the complex interplay of factors influencing teachers' decisions regarding AI integration in educational settings and highlight the importance of addressing technical, pedagogical, ethical, and institutional dimensions to promote responsible and effective AI use in education.

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